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ABSTRACT

The application of computers and information science to health and human service graduate studies at St. Mary's College is described. The programs are built on a microcomputer hardware and software base and draw on national database utilities to facilitate instructor-student communication as well as access to typical library data. The program design is based on information-related functions commonly performed by the professional health of human service manager. Each program topic is introduced by practitioner-faculty members who train students in software use by giving examples from their own experience. Students work independently or in small groups under the guidance of a preceptor to produce management analyses or plans that usually have a practical focus. Students are trained to use DIALOG and are helped in problem-solving and thesis research. Telecommunications links between remote sites and the college mainframe computer provide access to recordkeeping, budget management, and computer services. The performance of the program was measured using student evaluations, outside examiners, and graduate follow-up data. The program also shows significant cost savings when compared to traditional on-campus instruction. (SW)

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GRADUATE EDUCATION IN A MICROCOMPUTER ENVIRONMENT

New Delivery Systems For Non-Traditional Graduate Studies

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ABSTRACT

Graduate programs have been among the latecomers to the microcomputer instructional revolution. The traditional base underlying the majority of these programs has proven to be remarkably resistant to computer-based or computer-managed instruction. Consequently, it has been non-traditional programming which has served to test the applicability of microcomputing in graduate education.

This paper describes a three-year project undertaken at St. Marys College in which health and human service graduate programs have been built on a microcomputer hard- and software base. These programs also draw on national data base utilities such as SOURCE, COMPUSERVE, and DIALOG to facilitate instructor-student communication as well as access to typical library data. Telecommunications links between remote sites and

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the College mainframe computer provide access to record keeping, budget management, and computer services.

The performance of the program is measured using student evaluations, 'outside' examiners, and graduate follow-up data. The paper also addresses the efficacy of this delivery system from the perspective of college administrators. Cost-effectiveness studies are presented along with projections of potential market acceptance of this mode of instruction. Plans for future development include increased utilization of local and long-distance telecommunications as well as updated microcomputer systems. Applications to Baccalaureate completion programs are also described.

The paper represents a major contribution to the external degree offerings of the small college. The competitive advantage and cost savings associated with this type of delivery system makes it possible for the small college to capture a significant share of the growing market for non-traditional training of both graduate and undergraduate students.

COMPUTING AND GRADUATE EDUCATION

The rapid development of the information sciences is changing the shape of most professional practice. New ways of collecting, analyzing and transmitting information are also altering the shape of the organization. These changes place severe pressure on graduate education to insure that professionals in training have the opportunity to acquire appropriate and up to date skills. If higher education is to

respond to these challenges, educators must develop curricula and delivery systems which will make cost-effective use of current information technology. (Myers, 1983) In the pages that follow, we outline the application of information technology to graduate training in health and human service management.

In 1982, St. Mary's College initiated a design and development project with the support of Title III funds. This project was directed at the preparation of health and human service managers in a non-traditional graduate program. The program makes use of practicing manager-scholars as instructors and relies heavily on computing and telecommunications in its delivery system. At present, the program enrolls 90 students at three instructional sites in Minnesota. The program has graduated 16 students and has received high marks from its Title III evaluators.(Picton, 1984)

The use of information technology in the St. Mary's program takes a direction quite different from traditional practice. For example, little use is made of computer-based education (CBE), students are given only general training in computer science, and computer-managed education is not utilized at present. Instead, the program design is based the information-related functions commonly performed by the professional health or human service manager.

By analyzing training materials, textbooks, and studies of management practice, several key management functions were identified. (Weaver, 1984) These were further studied to

determine the information science support needed for each. Table I summarizes the results of this aspect of program design.

TABLE 1

MANAGEMENT FUNCTIONS AND
INFORMATION SCIENCE SUPPORT

MANAGEMENT FUNCTION	INFORMATION SUPPORT
ASSESSING	MEASUREMENT
REPORTING	DATA DISPLAY
ANALYZING	STATISTICS
DECISION MAKING	DECISION ANALYSIS
CONTROLLING	COMMUNICATIONS
PLANNING	SIMULATION

Table I provides the foundation for curriculum development by linking the subject matter of management training with those information science functions necessary for modern practice. This structure can then be expanded to show how specific computer software can be used to deliver management training. In Figure I we show this relationship in more detail. Figure I provides, in effect, the scope and sequence structure on which the health and human service program is based.

A key feature of Figure I is the linear progression of information science concepts and systems suggested by the dotted line. This represents the sequence aspect of curriculum design which takes shape in program courses and topics: software products are introduced and applied by students to integrate management and information sciences. The array of topics and products is shown in Table II.

TABLE II

PROGRAM TOPICS
AND SOFTWARE PACKAGES

TOPICS	SOFTWARE PACKAGES
TECHNOLOGY AND THE HUMAN SERVICES	DB MASTER - RBASE 4000 DIALOG - TRANSCEND
POPULATION AND NEEDS ASSESSMENT	STAT PRO - TK SOLVER FAST GRAPHS
SERVICE DELIVERY SYSTEM DESIGN	MICRO DYNAMO ENCORE!
MANAGEMENT METHODS	VISI SCHEDULE - RBASE CLOUT

It is important to note here that the above array is not merely a collection of popular microcomputer software. It is a fully integrated information support service for the prospective

human service manager. Of the 16 program graduates to date, all are presently using three or more of the above packages and several have moved to next-generation integrated packages.

DELIVERY SYSTEM

The non-traditional nature of the St. Mary's program is evident in the arrangements for delivery of the above concepts and systems. Each program topic is introduced by a practitioner-faculty member who trains students in software use by giving examples from his/her own experience. Students then work independently or in small groups under the guidance of a preceptor to produce management analyses or plans which usually have a practical focus.

The delivery system is supported by a high level of student committment to computer ownership. More than two-thirds of the students have their own microcomputers and half of that group own communications equipment. This makes it possible for fifty percent of the students to utilize on-line dialog and message services (SOURCE). This enables students to work one-on-one with their instructors and to share problems and solutions with other students.

A second use of on-line communications has to do with database search and retrieval. Students are trained in the use of DIALOG and are assisted in carrying out problem solving and thesis research. Currently, more than half of student thesis work utilizes information retrieved from DIALOG or similar databases. In most cases, these searches and projects are

integrated with problem solving and policy making in the student's home organization.

COST EFFECTIVENESS

While the program performs well on traditional measures of academic output, it is important to assess its cost-effectiveness as compared to more conventional modes of instruction. This can be done by examining selected input cost data and faculty productivity. In this case, we will be comparing the performance of the health and human service(H&HS) program with on-campus instruction operations.

The ratios we will be using for our cost comparisons result from the expansion of the basic revenue/cost ratio:

INSTRUCTION REVENUE(IR)/INSTRUCTION COST(IC)

This ratio can be expanded to yield several intermediate measures of instructional operations. (Gold, 1982)

IR/IC=(IR/FTE)*(FTE/FCOST)*(FCOST/IC)

In this equation, FTE refers to full-time equivalent faculty and FCOST to the total salary cost for faculty. Using summary data for the 1983-84 academic year, we can derive comparative ratios as shown below.

TABLE III

PROGRAM COST COMPARISONS

	HEALTH & HUMAN SERVICES	ON-CAMPUS PROGRAMS
TUITION (IR)	63240	5462000
FTE(Faculty)	5.75	82.5
STUD. CRED.HRS.	421	35480
FCOST	27600	2776000

LIB.&COMPUTING	4000	388000
DIRECT ADMIN.	2000	774000
FACILITY COST	5200	860560
INSTR. COST (IC)	38800	4798560
----------	PERFORMANCE RATIOS	----------
IR/IC	1.63	1.14
IR/FTE	10998	66206
1/(FTE/FCOST)	4800	33648
FCOST/IC	.711	.579

These data provide some interesting insights into the relative cost of the two instructional models. First, the ratio IR/IC shows that the Health and Human Service program gives a wider surplus or 'profit margin' than does on-campus instruction. Second, the on-campus faculty is more productive than H&HS faculty - by more than a factor of five. However, the large scale productivity of on-campus programs is more than offset by the cost of full time faculty and the supporting administrative and instructional services.

It can be argued that the investment in part-time faculty in the H&HS program gives a higher return than investment in their on-campus counterparts. Further, the low overhead of the H&HS program - made possible by the instructional model - makes it possible to channel these dollars into direct student service. In this way, the instructional model sets conditions for new patterns of resource flow within the institution.

There is an important extension to the instructional model

which can be inferred from Table III. That is, the significant cost savings attained by using the computer as an intellectual tool might restructure on-campus expenditures and make it possible for the College to better support undergraduate education. At this writing, the College is exploring the application of its H&HS experience at the undergraduate level and plans to engage in further tests of the model for baccalaureate completion programs in the health sciences.

SUMMARY

The instructional model described above is, we believe, representative of a major new direction in the application of computers and information sciences to graduate education. This direction might be thought of as utilization of computing as an intellectual tool instead of an instructional instrument. (Univ. of Oregon, 1982) In effect, the computer and its associated information handling systems become an integral part of the work environment of the student and provide ordering, analysis, and experimental support to learning and problem solving.

Although the program described in this paper is relatively new, there are indications that it is a cost-effective alternative to traditional instructional delivery systems. Not only does the program perform well as measured by its student output, it also shows significant cost savings when compared to traditional on-campus instruction. These indicators suggest that there may be significant potential for applying the concept of the computer as an intellectual tool to many graduate and

undergraduate offerings.

In addition to the operational efficiency of the pilot program, there is a major strategic potential for program development. This lies in the extension of the concept of a professional workstation to remote-site instruction. The College is currently experimenting with instructional offerings in several area hospitals each with one or more workstations configured to match program hard- and software. These stations will be linked to the College and to program faculty through various forms of telecommunications - ranging from electronic mail to live video lectures.

At this writing, the extension of the instructional model can be said to hold considerable promise for further development of the program. By enhancing the telecommunications services available to remote-site students, many of the information exchanges necessary for learning can be delivered in a cost-effective manner.

The program model is, in sum, a viable alternative to conventional computer use for graduate programming. However, its success rests on continual study of the intellectual support required for professional in training and on the inputs of scholar-practitioners. If these critical elements are present, the model can provide the impetus to restructure of graduate programming in the small college and to a new, productive relationship between training and professional practice.

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